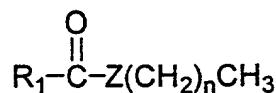


## CLAIMS

1. A compound having the formula:



wherein R<sub>1</sub>, Z and the carbonyl can be comprised by a common ring, wherein  
5 R<sub>1</sub> comprises a chromophore that absorbs light from the visible wavelength  
range; wherein the segment Z comprises one or more of C, O, N and S; and  
wherein n is an integer that is at least 12.

2. The compound of claim 1 wherein n is at least 17 and not more  
10 than 299.

3. The compound of claim 1 wherein the segment Z(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub> is  
NH(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub>.

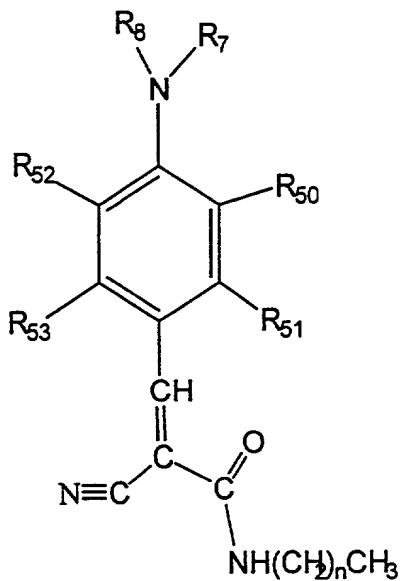
15 4. The compound of claim 1 wherein the segment Z(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub> is  
  
 $\text{CH}_3(\text{CH}_2)_n-\text{N}-\text{(CH}_2)_y\text{CH}_3$

wherein y is an integer of from 0 to 300, and can be the same or different than  
20 n.

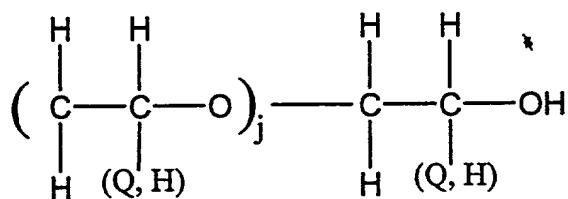
25 5. The compound of claim 1 wherein the R<sub>1</sub> and the carbonyl  
together comprise a chemical group selected from the group consisting of ester,  
lactone, amide, lactam, and imide.

25

6. The compound of claim 1 having the formula

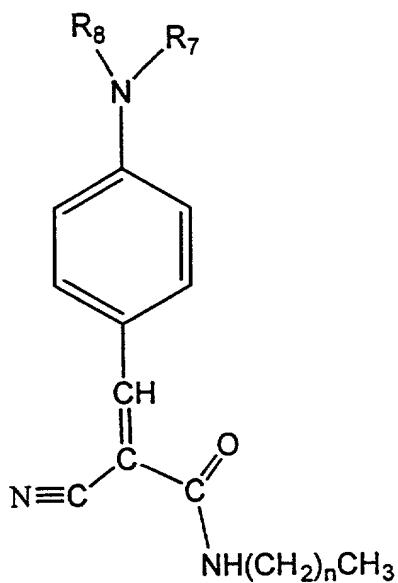


wherein  $R_{50}$ ,  $R_{51}$ ,  $R_{52}$ , and  $R_{53}$  are selected from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and 5 alkyl groups, and can be the same as one another or different than one another; and wherein at least one of  $R_7$  and  $R_8$  comprises a chain having the formula,

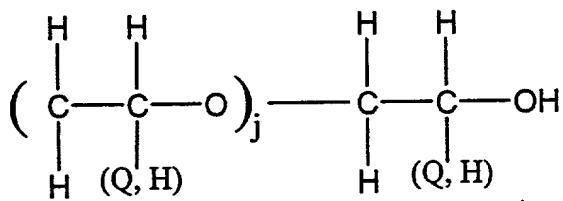


wherein  $j$  is an integer from 0 to about 300, wherein the representation of " $(Q, H)$ " indicates that either a group  $Q$  or a hydrogen can be in the shown 10 positions, wherein the group  $Q$  is either an alkyl group or an aryl group, and wherein  $Q$  can vary amongst different alkyl and aryl groups within the chain.

7. The compound of claim 1 having the formula

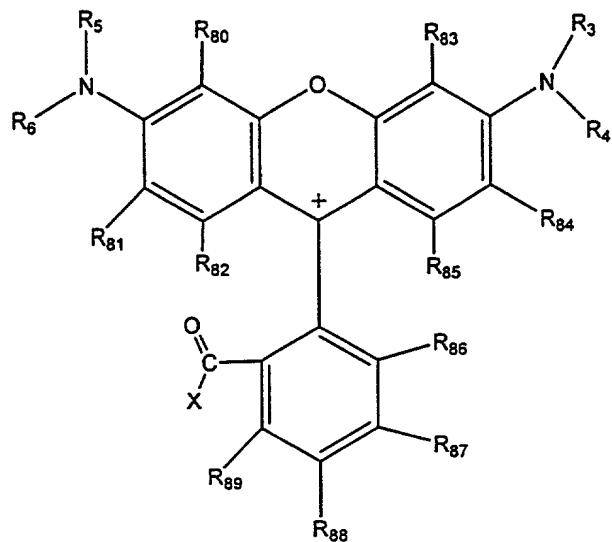


wherein at least one of R<sub>7</sub> and R<sub>8</sub> comprises a chain having the formula,



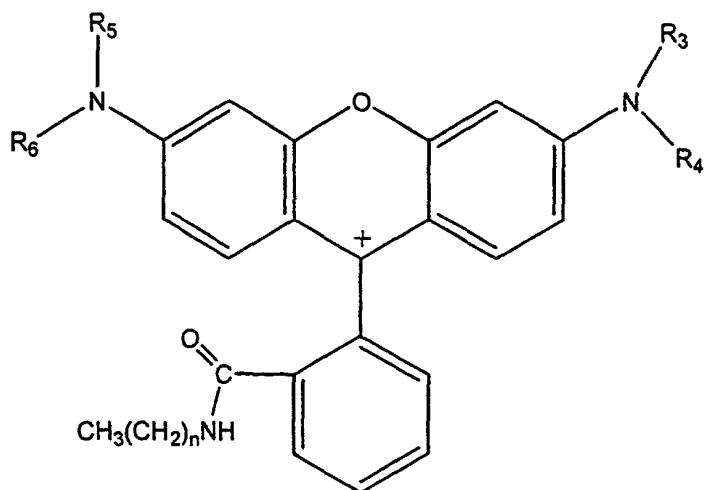
5 wherein j is an integer from 0 to about 300, wherein the representation of "(Q, H)" indicates that either a group Q or a hydrogen can be in the shown positions, wherein the group Q is either an alkyl group or an aryl group, and wherein Q can vary amongst different alkyl and aryl groups within the chain.

8. The compound of claim 1 having the formula



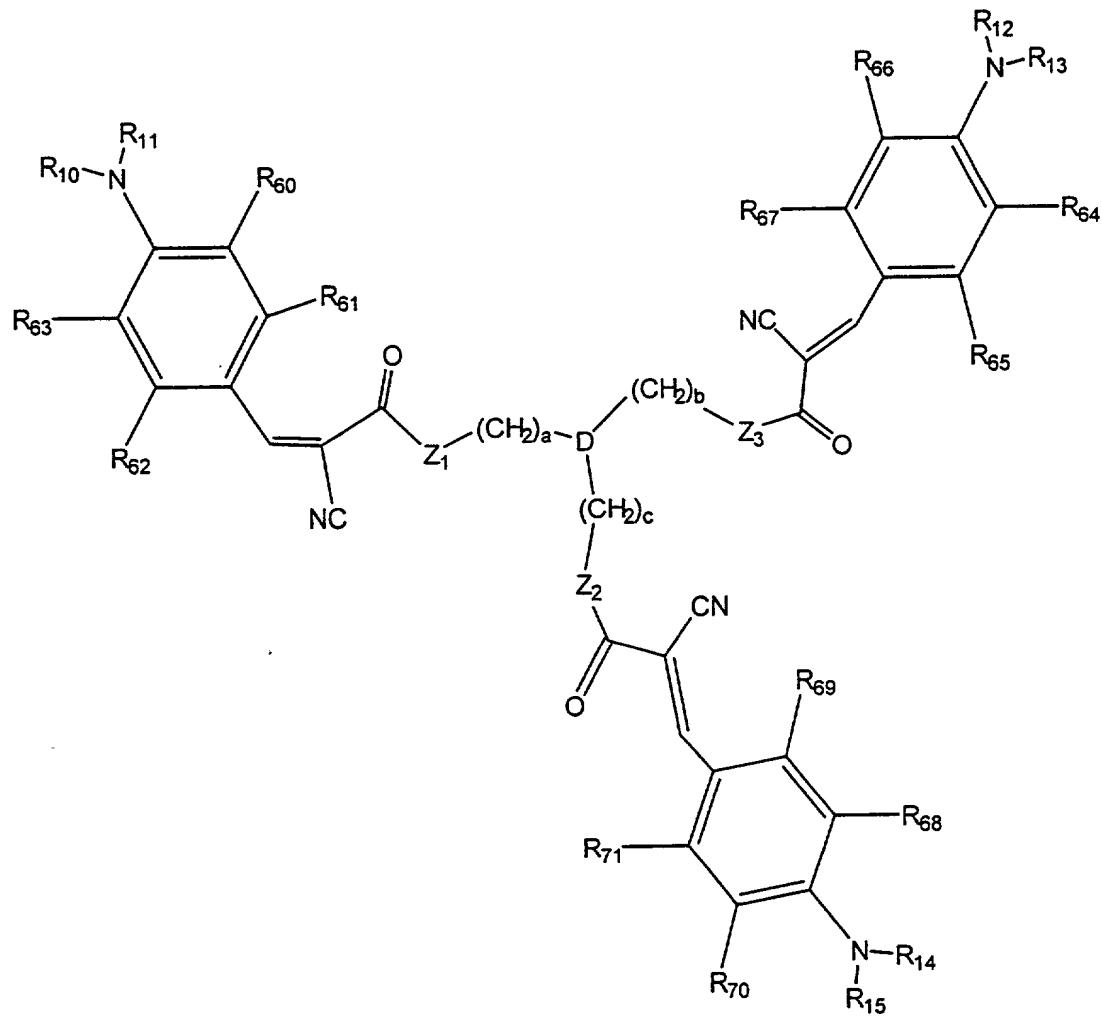
wherein R<sub>80</sub>, R<sub>81</sub>, R<sub>82</sub>, R<sub>83</sub>, R<sub>84</sub>, R<sub>85</sub>, R<sub>86</sub>, R<sub>87</sub>, R<sub>88</sub>, and R<sub>89</sub> are selected from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; and wherein R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub> comprise carbon and can be the same or different than one another.

9. The compound of claim 1 having the formula



wherein  $R_3$ ,  $R_4$ ,  $R_5$  and  $R_6$  comprise carbon and can be the same or different than one another.

10. A compound having the formula:



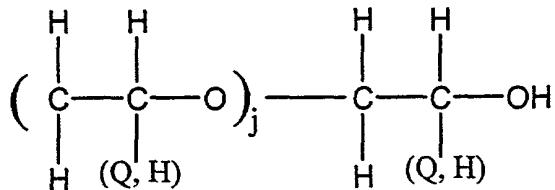
wherein R<sub>60</sub>, R<sub>61</sub>, R<sub>62</sub>, R<sub>63</sub>, R<sub>64</sub>, R<sub>65</sub>, R<sub>66</sub>, R<sub>67</sub>, R<sub>68</sub>, R<sub>69</sub>, R<sub>70</sub>, and R<sub>71</sub> are selected

from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; wherein D comprises carbon, sulphur, phosphorus or nitrogen; wherein  $R_{10}$ ,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$  and  $R_{15}$  comprise at least one of 5 carbon or hydrogen, and can be the same or different than one another; wherein  $Z_1$ ,  $Z_2$  and  $Z_3$  can be the same or different than one another and comprise S, O, C or N; and wherein a, b and c can be the same or different than one another and are integers that are at least 1.

10 11. The compound of claim 10 wherein  $R_{60}$ ,  $R_{61}$ ,  $R_{62}$ ,  $R_{63}$ ,  $R_{64}$ ,  $R_{65}$ ,  $R_{66}$ ,  $R_{67}$ ,  $R_{68}$ ,  $R_{69}$ ,  $R_{70}$ , and  $R_{71}$  are hydrogen.

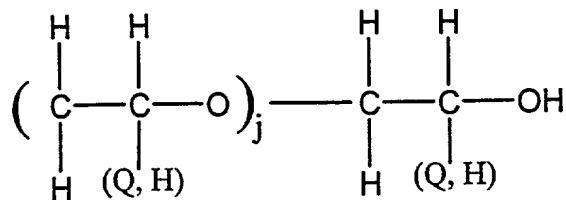
12. The compound of claim 10 wherein D is nitrogen, and is in a cationic form.

15 13. The compound of claim 10 wherein at least one of  $R_{10}$ ,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$  and  $R_{15}$  comprises a chain having the formula



20 wherein  $j$  is an integer from 0 to about 300, wherein the representation of " $(Q, H)$ " indicates that either a group Q or a hydrogen can be in the shown positions, wherein the group Q is either an alkyl group or an aryl group, and wherein Q can vary amongst different alkyl and aryl groups within the chain.

14. The compound of claim 10 wherein each of  $R_{10}$ ,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$  and  $R_{15}$  comprises a chain having the formula

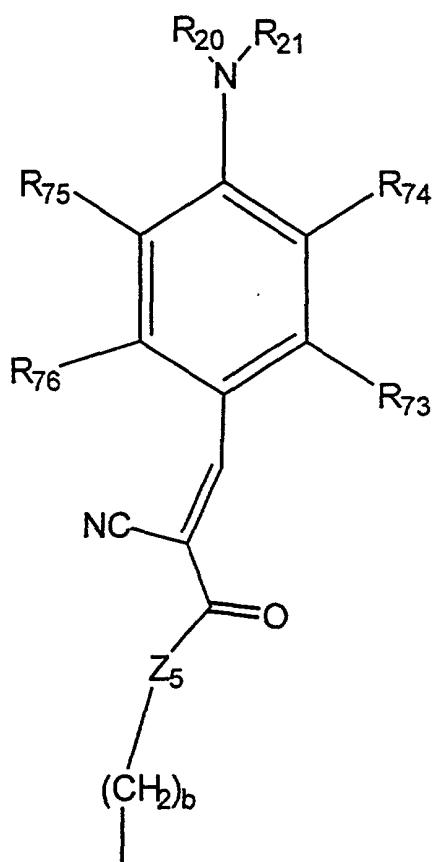


wherein  $j$  is an integer from 0 to about 300, wherein the representation of "(Q, H)" indicates that either a group Q or a hydrogen can be in the shown positions, wherein the group Q is either an alkyl group or an aryl group, and wherein Q can vary amongst different alkyl and aryl groups within the chain.

15. The compound of claim 10 wherein each of  $Z_1$ ,  $Z_2$  and  $Z_3$  is NH.

10

16. A compound comprising at least two segments of the formula shown below joined to one another through a common atom or multi-atom structure:



wherein  $R_{73}$ ,  $R_{74}$ ,  $R_{75}$ , and  $R_{76}$  are selected from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; wherein  $R_{20}$ ,  $R_{21}$  comprise at least one of carbon or hydrogen, and can be the same or different than one another; wherein  $Z_5$  comprises at least one of C, S, O or N; wherein  $b$  comprises an integer that is at least 1; the integer  $b$  being the same or different amongst the different segments;  $Z_5$  being the same or different amongst the different segments; and the groups  $R_{20}$  and  $R_{21}$  being the same or different amongst the different segments.

10

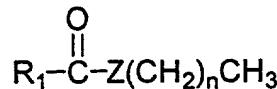
17. The compound of claim 16 wherein  $R_{73}$ ,  $R_{74}$ ,  $R_{75}$ , and  $R_{76}$  are hydrogen.

18. The compound of claim 16 wherein the compound comprises at least three of the segments having the shown formula.

19. The compound of claim 16 wherein the at least two segments are joined through a common atom, said common atom being either carbon, sulfur, phosphorus or nitrogen.

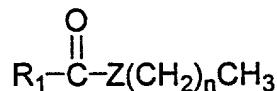
20

20. A solid phase change ink composition consisting essentially of a colorant having the formula:



25 wherein  $R_1$ ,  $Z$  and the carbonyl can be comprised by a common ring, wherein said colorant comprises a chromophore that absorbs light from the visible wavelength range, wherein the segment  $Z$  comprises one or more of carbon, oxygen, sulfur and nitrogen, and wherein  $n$  is an integer that is at least 12.

21. A solid phase change ink composition, comprising:  
a phase change ink carrier; and  
a colorant having the formula:



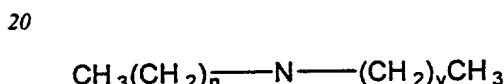
5 wherein  $\text{R}_1$ ,  $\text{Z}$  and the carbonyl can be comprised by a common ring, wherein  
said colorant comprises a chromophore that absorbs light from the visible  
wavelength range, wherein the segment  $\text{Z}$  comprises one or more of carbon,  
oxygen, sulfur and nitrogen, and wherein  $n$  is an integer that is at least 12.

10 22. The phase change ink of claim 21 wherein  $n$  is at least 17 and not  
more than 299.

23. The phase change ink of claim 21 wherein  $\text{Z}$  is O, NH or S.

15 24. The phase change ink of claim 21 wherein the segment  
 $\text{Z}(\text{CH}_2)_n\text{CH}_3$  is  $\text{NH}(\text{CH}_2)_n\text{CH}_3$ .

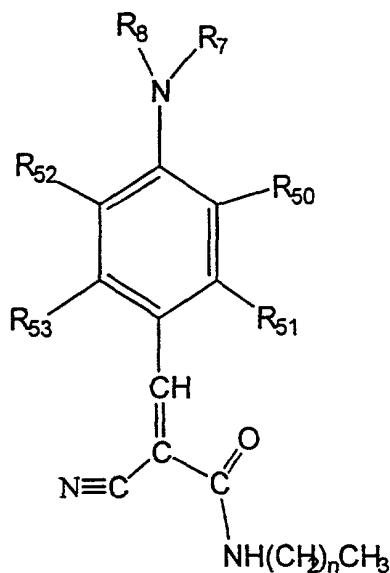
25. The phase change ink of claim 21 wherein the segment  
 $\text{Z}(\text{CH}_2)_n\text{CH}_3$  is



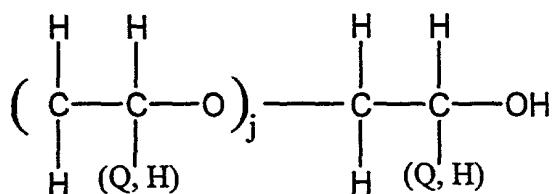
wherein  $y$  is an integer of from 0 to 300, and can be the same or different  
than  $n$ .

25 26. The phase change ink of claim 21 wherein the  $\text{R}_1$  and the carbonyl  
together comprise a chemical group selected from the group consisting of ester,  
lactone, amide, lactam, and imide.

27. The phase change ink of claim 21 wherein the colorant has the formula



wherein R<sub>50</sub>, R<sub>51</sub>, R<sub>52</sub>, and R<sub>53</sub> are selected from the group consisting of  
5 hydrogens, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and  
alkyl groups, and can be the same as one another or different than one another;  
wherein at least one of R<sub>7</sub> and R<sub>8</sub> comprises a chain having the formula,

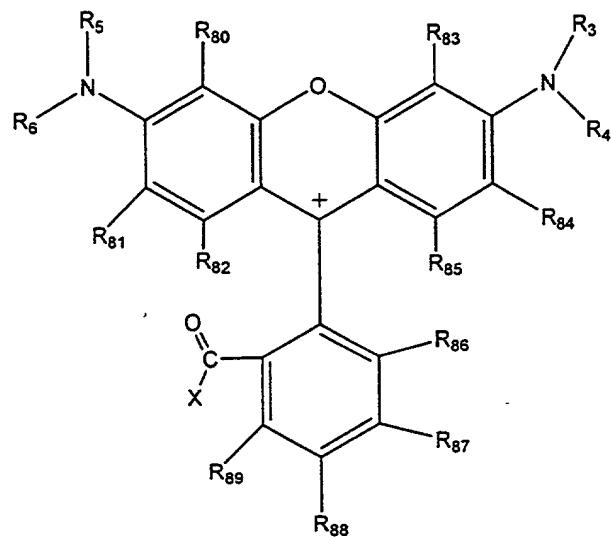


wherein j is an integer from 0 to about 300, wherein the representation of "(Q,  
10 H)" indicates that either a group Q or a hydrogen can be in the shown

positions, wherein the group Q is either an alkyl group or an aryl group, and wherein Q can vary amongst different alkyl and aryl groups within the chain.

28. The phase change ink of claim 27 wherein R<sub>50</sub>, R<sub>51</sub>, R<sub>52</sub>, and R<sub>53</sub> are hydrogen.

29. The phase change ink of claim 21 wherein the colorant has the formula

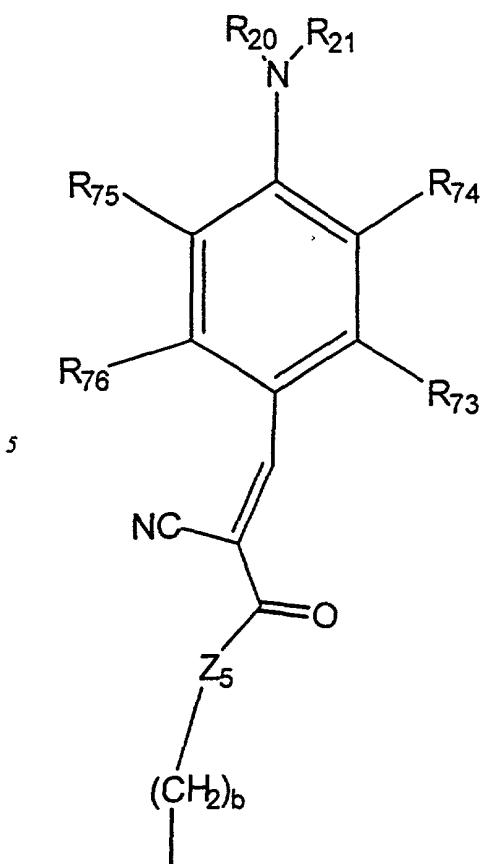


10 wherein R<sub>80</sub>, R<sub>81</sub>, R<sub>82</sub>, R<sub>83</sub>, R<sub>84</sub>, R<sub>85</sub>, R<sub>86</sub>, R<sub>87</sub>, R<sub>88</sub>, and R<sub>89</sub> are selected from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; wherein R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub> comprise carbon and can be the same or different than one another.

30. The phase change ink of claim 29 wherein  $R_{80}$ ,  $R_{81}$ ,  $R_{82}$ ,  $R_{83}$ ,  $R_{84}$ ,  $R_{85}$ ,  $R_{86}$ ,  $R_{87}$ ,  $R_{88}$ , and  $R_{89}$  are hydrogen.

PRINTED IN U.S.A. ON 100% RECYCLED PAPER

31. A solid phase change ink composition, comprising:  
a phase change ink carrier; and  
a colorant having at least two segments of the formula shown below joined to  
one another through a common atom or multi-atom structure:



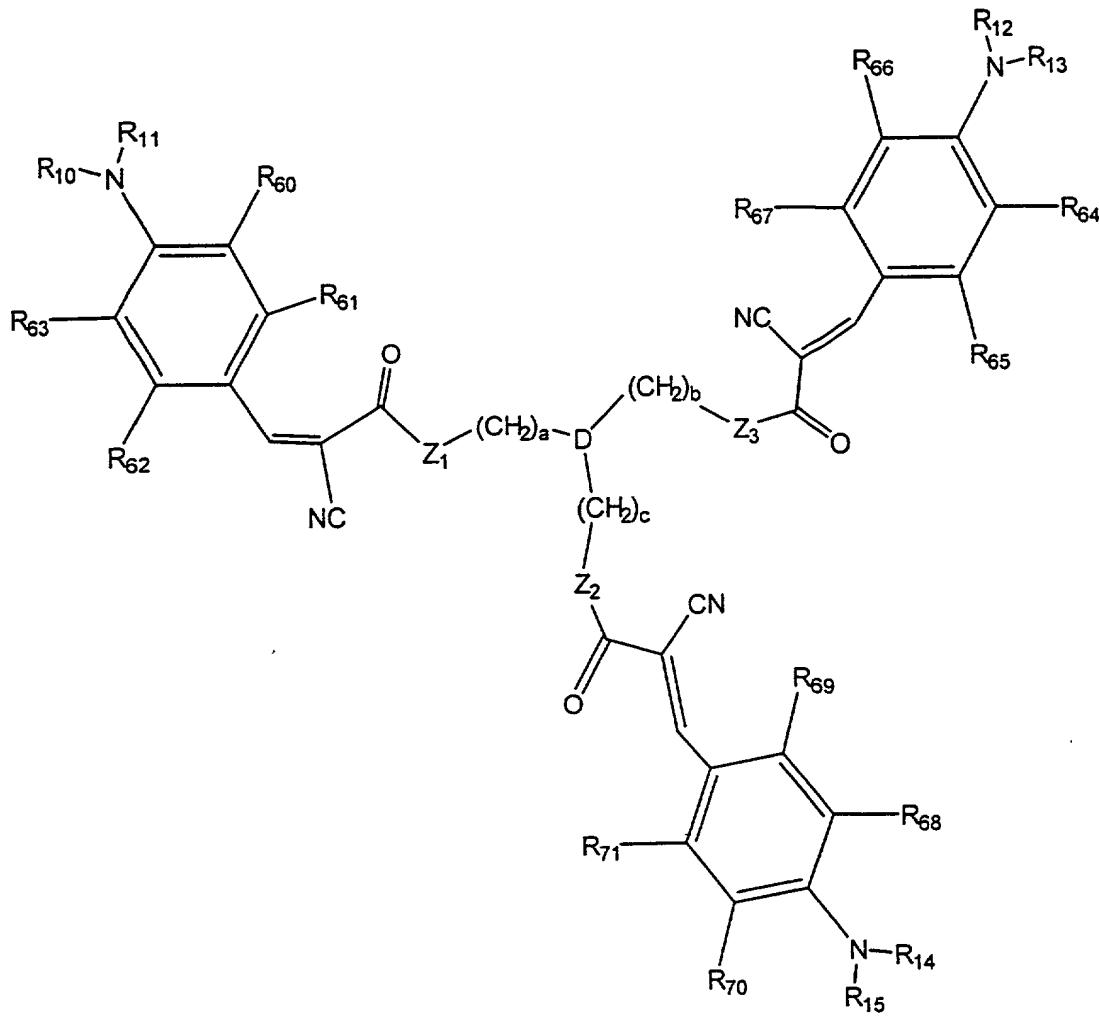
wherein  $R_{73}$ ,  $R_{74}$ ,  $R_{75}$ , and  $R_{76}$  are selected from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; wherein said colorant comprises a chromophore that absorbs light from the 5 visible wavelength range; wherein  $R_{20}$ ,  $R_{21}$  comprise at least one of carbon or hydrogen, and can be the same or different than one another; wherein  $Z_5$  comprises at least one of C, S, O or N; and wherein  $b$  comprises an integer that is at least 1; the integer  $b$  being the same or different amongst the different segments;  $Z_5$  being the same or different amongst the different segments; and 10 the groups  $R_{20}$  and  $R_{21}$  being the same or different amongst the different segments.

32. The phase change ink of claim 31 wherein  $R_{73}$ ,  $R_{74}$ ,  $R_{75}$ , and  $R_{76}$  are hydrogen.

15

33. The phase change ink of claim 31 wherein the at least two segments are joined through a common atom, said common atom being either carbon, phosphorus, sulfur or nitrogen.

34. A solid phase change ink composition consisting essentially of a colorant having the formula:



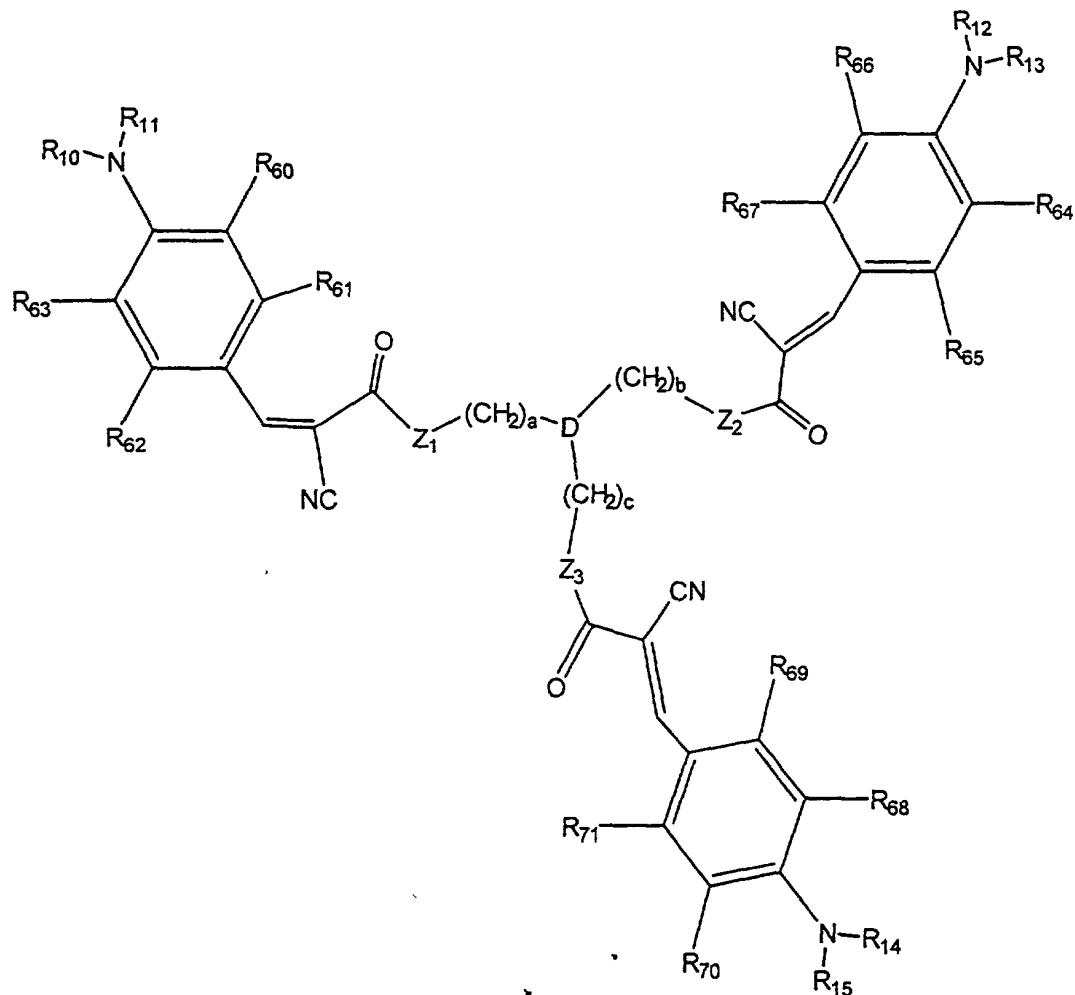
wherein  $R_{60}$ ,  $R_{61}$ ,  $R_{62}$ ,  $R_{63}$ ,  $R_{64}$ ,  $R_{65}$ ,  $R_{66}$ ,  $R_{67}$ ,  $R_{68}$ ,  $R_{69}$ ,  $R_{70}$ , and  $R_{71}$  are selected

from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; wherein said colorant comprises a chromophore that absorbs light from the visible wavelength range; wherein R<sub>10</sub>, R<sub>11</sub>, R<sub>12</sub>, R<sub>13</sub>,  
5 R<sub>14</sub> and R<sub>15</sub> comprise at least one of carbon or hydrogen, and can be the same or different than one another; wherein D comprises carbon, sulphur, phosphorus or nitrogen, wherein Z<sub>1</sub>, Z<sub>2</sub> and Z<sub>3</sub> can be the same or different than one another and comprise S, O, C or N; and wherein a, b and c can be the same or different than one another and are integers that are at least 1.

10

35. The phase change ink of claim 34 wherein R<sub>60</sub>, R<sub>61</sub>, R<sub>62</sub>, R<sub>63</sub>, R<sub>64</sub>, R<sub>65</sub>, R<sub>66</sub>, R<sub>67</sub>, R<sub>68</sub>, R<sub>69</sub>, R<sub>70</sub>, and R<sub>71</sub> are hydrogen.

36. A solid phase change ink composition, comprising:  
 a phase change ink carrier; and  
 a colorant having the formula:



wherein  $R_{60}$ ,  $R_{61}$ ,  $R_{62}$ ,  $R_{63}$ ,  $R_{64}$ ,  $R_{65}$ ,  $R_{66}$ ,  $R_{67}$ ,  $R_{68}$ ,  $R_{69}$ ,  $R_{70}$ , and  $R_{71}$  are selected from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; wherein said colorant comprises a chromophore  
5 that absorbs light from the visible wavelength range; wherein  $R_{10}$ ,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$  and  $R_{15}$  comprise at least one of carbon or hydrogen, and can be the same or different than one another; wherein D comprises carbon, sulphur, phosphorus or nitrogen, wherein  $Z_1$ ,  $Z_2$  and  $Z_3$  can be the same or different than one another and comprise S, O, C or N; and wherein a, b and c can be the same  
10 or different than one another and are integers that are at least 1.

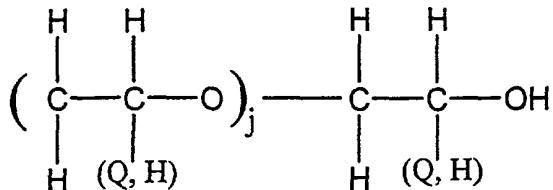
37. The phase change ink of claim 36 wherein  $R_{60}$ ,  $R_{61}$ ,  $R_{62}$ ,  $R_{63}$ ,  $R_{64}$ ,  $R_{65}$ ,  $R_{66}$ ,  $R_{67}$ ,  $R_{68}$ ,  $R_{69}$ ,  $R_{70}$ , and  $R_{71}$  are hydrogen.

15 38. The phase change ink of claim 36 wherein D is a cationic form of nitrogen and accordingly has a positive charge, and further comprising a negative ion paired with the positively charged D.

39. The phase change ink of claim 36 wherein D is a cationic form  
20 of nitrogen and accordingly has a positive charge, and further comprising a negative ion paired with the positively charged D, the negative ion being a halogen.

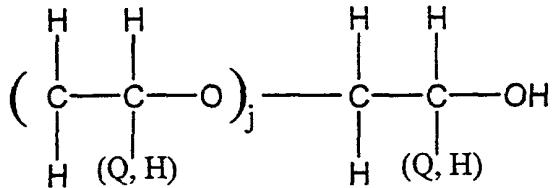
40. The phase change ink of claim 36 wherein D is a cationic form  
25 of nitrogen and accordingly has a positive charge, and further comprising a negative ion paired with the positively charged D, the negative ion being deprotonated dodecyl benzene sulfonic.

41. The phase change ink of claim 36 wherein at least one of  $R_{10}$ ,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$  and  $R_{15}$  comprises a chain having the formula



wherein  $j$  is an integer from 0 to about 300, wherein the representation of "(Q, H)" indicates that either a group Q or a hydrogen can be in the shown positions, wherein the group Q is either an alkyl group or an aryl group, and wherein Q can vary amongst different alkyl and aryl groups within the chain.

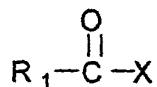
42. The phase change ink of claim 36 wherein each of  $R_{10}$ ,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ ,  $R_{14}$  and  $R_{15}$  comprises a chain having the formula



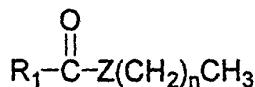
wherein  $j$  is an integer from 0 to about 300, wherein the representation of "(Q, H)" indicates that either a group Q or a hydrogen can be in the shown positions, wherein the group Q is either an alkyl group or an aryl group, and wherein Q can vary amongst different alkyl and aryl groups within the chain.

43. The phase change ink of claim 36 wherein each of  $Z_1$ ,  $Z_2$  and  $Z_3$  is NH.

44. A method of forming a colorant comprising reacting a first compound having the formula,



with a second compound having the formula  $\text{Z}(\text{CH}_2)_n\text{CH}_3$ , wherein  $n$  is an integer that is at least 12, to form a third compound having the formula,



wherein the third compound comprises a chromophore that absorbs light from the visible wavelength range.

10 45. The method of claim 44 wherein  $n$  is at least 17 and not more than 299.

46. The method of claim 44 wherein  $Z$  is selected from the group consisting of carbon, oxygen, sulphur and nitrogen.

15 47. The method of claim 44 wherein the structure  $\text{Z}(\text{CH}_2)_n\text{CH}_3$  is  $\text{NH}_2(\text{CH}_2)_n\text{CH}_3$ .

48. The method of claim 44 wherein the structure  $\text{Z}(\text{CH}_2)_n\text{CH}_3$  is  
20  $\text{CH}_3(\text{CH}_2)_n-\overset{\text{H}}{\underset{\text{N}}{\text{—}}}-\text{(CH}_2)_y\text{CH}_3$

wherein  $y$  is an integer of from 0 to 300, and can be the same or different than  $n$ .

25 49. The method of claim 44 wherein  $X$  is  $\text{O}(\text{CH}_2)_m\text{CH}_3$ , and wherein  $m$  is an integer of from 0 to 10.

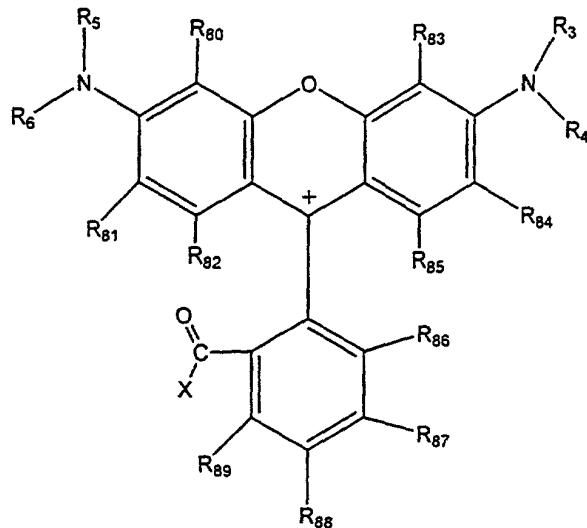
50. The method of claim 44 wherein the R<sub>1</sub> and the carbonyl together comprise a chemical group selected from the group consisting of ester, lactone, amide, lactam, and imide.

5 51. The method of claim 44 wherein the R<sub>1</sub> and the carbonyl together comprise an auxochrome.

52. The method of claim 44 wherein the R<sub>1</sub> comprises an auxochrome.

10 53. The method of claim 44 wherein the chromophore comprises at least a segment selected from the group consisting of methine, metal phthalocyanine, azamethine, azo, triphenylmethane, rhodamine, xanthene, indoaniline, pyridone, perylene, anthrapyridone and anthraquinone.

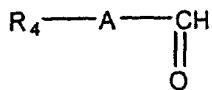
54. The method of claim 44 wherein the first compound is



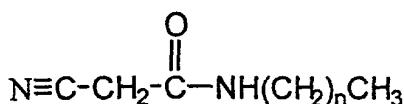
wherein R<sub>80</sub>, R<sub>81</sub>, R<sub>82</sub>, R<sub>83</sub>, R<sub>84</sub>, R<sub>85</sub>, R<sub>86</sub>, R<sub>87</sub>, R<sub>88</sub>, and R<sub>89</sub> are selected from the group consisting of hydrogen, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; wherein R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub> comprise carbon and can be the same or different than one another.

10 55. The method of claim 54 wherein R<sub>80</sub>, R<sub>81</sub>, R<sub>82</sub>, R<sub>83</sub>, R<sub>84</sub>, R<sub>85</sub>, R<sub>86</sub>, R<sub>87</sub>, R<sub>88</sub>, and R<sub>89</sub> are hydrogen.

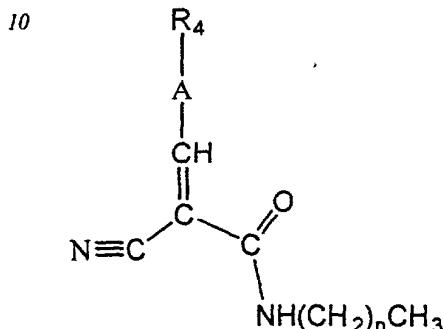
56. A method of forming a colorant comprising:  
providing a first compound having the formula



wherein A is an aromatic ring and  $R_4$  comprises one or both of carbon and hydrogen, and wherein said first compound comprises a chromophore that absorbs light from the visible wavelength range; and reacting said first compound with a second compound having the formula



to form a third compound having the formula



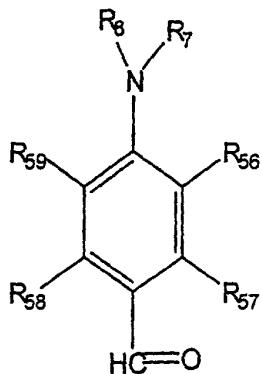
wherein  $n$  is an integer that is at least 12.

57. The method of claim 56 wherein  $n$  is at least 17 and not more than 299.

15

58. The method of claim 56 wherein the second compound comprises stearyl cyanoacetate, stearyl cyanoacetamide, or a mixture of stearyl cyanoacetate and stearyl cyanoacetamide.

59. The method of claim 56 wherein the first compound is

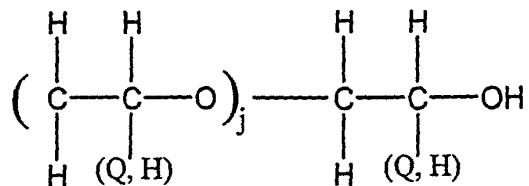


wherein R<sub>56</sub>, R<sub>57</sub>, R<sub>58</sub>, and R<sub>59</sub> are selected from the group consisting of 5 hydrogens, halogens, hydroxy groups, alkoxy groups, trifluoromethyl groups, and alkyl groups, and can be the same as one another or different than one another; and wherein R<sub>7</sub> and R<sub>8</sub> can be the same or different than one another, can be comprised by a common ring, and are selected from the group consisting of H and carbon-containing materials.

10

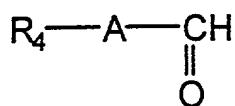
60. The method of claim 59 wherein R<sub>56</sub>, R<sub>57</sub>, R<sub>58</sub>, and R<sub>59</sub> are hydrogen.

61. The method of claim 59 wherein at least one of  $R_7$  and  $R_8$  comprises a chain having the formula,

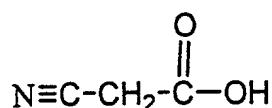


wherein  $j$  is an integer from 0 to about 300, wherein the representation of "(Q, H)" indicates that either a group Q or a hydrogen can be in the shown positions, wherein the group Q is either an alkyl group or an aryl group, and wherein Q can vary amongst different alkyl and aryl groups within the chain.

62. A method of forming a colorant comprising:  
providing a first compound having the formula

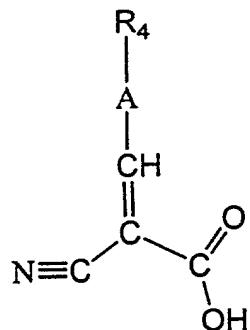


wherein A is an aromatic ring and  $R_4$  comprises one or both of carbon and  
5 hydrogen, and wherein the combination of  $R_4$  and A comprises a chromophore  
that absorbs color in the visible wavelength range; reacting said first compound  
with a second compound having the formula

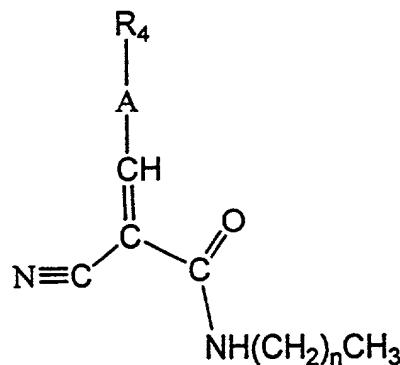


to form a third compound having the formula;

10



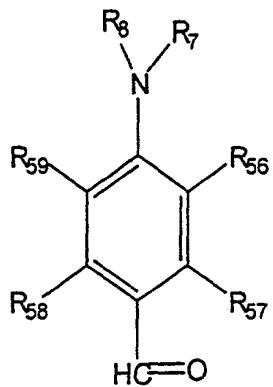
and reacting said third compound with  $\text{NH}_2(\text{CH}_2)_n\text{CH}_3$  to form



wherein n is an integer that is at least 12.

63. The method of claim 62 wherein n is at least 17 and not more than 299.

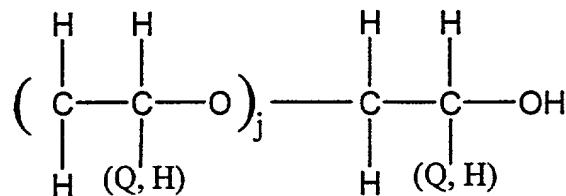
64. The method of claim 62 wherein the first compound is



10

65. The method of claim 64 wherein  $R_{56}$ ,  $R_{57}$ ,  $R_{58}$ , and  $R_{59}$  are hydrogen.

66. The method of claim 64 wherein at least one of R<sub>7</sub> and R<sub>8</sub> comprises a chain having the formula,



wherein j is an integer from 0 to about 300, wherein the representation of "(Q, H)" indicates that either a group Q or a hydrogen can be in the shown positions, wherein the group Q is either an alkyl group or an aryl group, and wherein Q can vary amongst different alkyl and aryl groups within the chain.